TABLE 2-continued

Results of durability test on Four Ball Wear Tester (ball: uncoated Ti-6Al-4V; flats: ASTM grade 2 pure Ti coated by Dow epoxy-novolac DEN438-A85 blended with 2% diamond powder (0–1 micron) anti-wear filler; speed; 200 rpm/r.t./lubricant: PPO)

Example	Loading (Kg)	Cumulative Time (hrs)	Friction Coefficient	WSD (mm)
12	15	200 + 25 + 5	0.10	—
13	15	200 + 25 + 25	0.10	1.72
14	15	200 + 25 + 45	0.11	2.05
15	15	200 + 25 + 70	0.12	2.03

WSD = Wear sear diameter

The foregoing detailed description and examples were presented for the purposes of illustration and description only and are not be construed as limiting the invention in any way. The scope of the invention is to be determined by the claims appended hereto.

What is claimed is:

1. A friction and wear resistant coated titanium or titanium alloy which comprises:

(a) a titanium or titanium alloy substrate;

(b) a first layer of Ti_xO_y, wherein x is from 1–2 and y is from 1–3, bonded to a surface of said titanium or titanium alloy substrate; and

(c) a second layer comprising a cured epoxy resin bonded to said first layer.

2. A coated titanium or titanium alloy as claimed in claim **1** wherein said substrate comprises at least 50% titanium and said first layer comprises a substantial amount of titanium dioxide.

3. A coated titanium or titanium alloy as claimed in claim **2** wherein said second layer comprises 0.1–50 parts by weight, based on the weight of the cured epoxy resin, of at least one wear resistant filler material.

4. A coated titanium or titanium alloy as claimed in claim **3** wherein the wear resistant filler material is selected from diamond powder, boron nitride powder, silicon carbide powder, corundum, ceramic wool, ceramic spheres, zinc oxide, bauxite, silica, titanium dioxide and alumina.

5. A coated titanium or titanium alloy as claimed in claim **4** wherein said second layer comprises 1–5 parts by weight, based on the weight of the cured epoxy resin, of diamond powder wear resistant filler having an average particle size of less than 1 micron.

6. A coated titanium or titanium alloy as claimed in claim **2** wherein said epoxy resin comprises a glycidyl ether.

7. A coated titanium or titanium alloy as claimed in claim **6** wherein said glycidyl ether is selected from n-butyl glycidyl ether and 4,4'-isopropylidene-bis-phenyl diglycidyl ether.

8. A coated titanium or titanium alloy as claimed in claim **2** wherein said first layer is formed by treating the titanium or titanium alloy with a tetraalkyl titanate.

9. A coated titanium or titanium alloy as claimed in claim **1** wherein said substrate comprises a material selected from titanium and the titanium alloy Ti—6Al—4V.

10. A method for producing a coated titanium or titanium alloy as claimed in claim **1** comprising the steps of:

(a) forming a Ti_xO_y layer on the surface of the titanium or titanium alloy wherein x is from 1–2 and y is from 1–3;

(b) coating the Ti_xO_y layer with a composition comprising an epoxy resin; and

(c) curing the epoxy resin with an epoxy resin curing agent.

11. A method in accordance with claim **10** wherein the titanium or titanium alloy comprises at least 50% titanium and the Ti_xO_y layer comprises titanium dioxide.

12. A method in accordance with claim **10** wherein the coating comprises 0.1–50 parts by weight, based on the weight of the coating, of a wear resistant filler material.

13. A method in accordance with claim **12** wherein the wear resistant filler material is selected from diamond powder, boron nitride powder, silicon carbide powder, corundum, ceramic wool, ceramic spheres, zinc oxide, bauxite, silica, titanium dioxide and alumina.

14. A method in accordance with claim **13** wherein the coating comprises 1–5 parts by weight, based on the weight of the coating, of a diamond powder wear resistant material having a particle size of less than 1 micron.

15. A method in accordance with claim **10** wherein step (a) comprises the step of treating the surface of the titanium or titanium alloy with a tetraalkyl titanate in order to form a layer comprising titanium dioxide on the surface of the titanium or titanium alloy.

16. A method in accordance with claim **10** wherein said epoxy resin comprises at least one glycidyl ether.

17. A method in accordance with claim **16** wherein the glycidyl ether comprises a compound selected from n-butyl glycidyl ether and 4,4'-isopropylidene-bis-phenyl diglycidyl ether.

18. A method in accordance with claim **17** wherein step (c) employs a curing agent which comprises 2-ethyl-4-methylimidazole and the tetraalkyl titanate employed in step (a) comprises tetra-n-butyl titanate.

19. A method in accordance with claim **17** wherein step (c) employs an acidic or basic curing agent for epoxy resins.

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